



## \* NOTICES \*

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## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the retry control unit of the suitable external storage controller for the processing-time compaction in the severe environment of command execution time amount especially about the retry control unit of the external storage controller to a magnetic disk drive etc.

[0002]

[Description of the Prior Art] By the conventional external storage controller, time supervision to the magnetic disk drive by said controller was performed using the table (the retry processing time required for every count of a retry is table-ized according to the lead or the light) of the retry processing time corresponding to the count of a retry about the lead and the light.

[0003] Although it is effective for the time supervision of retry processing when a read error and a write error occur when time supervision for every retry processing is performed using the retry processing-time table about this lead and light, for the time supervision of command processing covering two or more sectors, said just table is inadequate.

[0004]

[Problem(s) to be Solved by the Invention] Although it is effective in the time supervision of retry processing when a read error and a write error occur when time supervision to the magnetic disk drive by said controller is performed using the retry processing-time table about the lead and light in a Prior art For the time supervision of command processing covering two or more sectors, since the access time to the normal sector which retry processing does not generate is not taken into consideration, when the host computer of a high order specifies the processing time of the whole command, the case where a command is not completed within the convention time amount occurs.

[0005] Namely, since the controller is performing only time management on the table of retry processing, managing command processing covering two or more sectors by high order equipment with the convention time amount for the processing when ordering a controller For example, even if it judges that the time amount which the 1st retry processing takes is detected on a table, such retry processing is repeated two or more times, time amount is detected on a table each time, and the integrated value has not yet reached the convention time amount of high order equipment Actually, it is the time amount for the access (although the normal access time for every sector is very smallness compared with the retry processing time) at the time of access to many normal sectors. the time amount which cannot disregard the integrated value of the normal access time when a large number [ a normal sector ] -- becoming -- since it has required, the case where convention time amount is reached is possible (since the access time to a normal sector is not managed by the controller). In this case, a command will be completed within convention time amount.

[0006]

[Means for Solving the Problem] In order to solve said technical problem, this invention adopts the following configurations.

[0007] The retry control unit of the external storage controller which interrupts processing of said command compulsorily when processing of said command which supervised the processing time which processes the command received from high order equipment in the external storage controller to a magnetic disk drive, and includes the retry processing to said magnetic disk drive is not completed in convention time amount.

[0008] Moreover, it sets for the external storage controller to a magnetic disk drive. The time amount which the access time to the sector which sets up the whole time amount which command processing received from high order equipment takes, and the retry processing to said magnetic disk drive does not generate, and retry processing take The retry control unit of the external storage controller which carries out sequential subtraction from said set-up whole time amount, judges whether said access and said retry processing can be performed in said subtracted time amount, and will interrupt processing of said command compulsorily if activation is improper.

[0009] moreover -- the case where judged whether automatic change processing would be required as a result of said retry processing, and it is judged in the retry control unit of said external storage controller that said automatic change processing is required -- said automatic change processing -- the inside of said convention time amount -- or the retry control unit of the external-storage controller which performs said automatic change processing after checking that it can perform in said subtraction time amount.

[0010]

[Embodiment of the Invention] Retry control of the magnetic disk drive concerning the operation gestalt of this invention is explained below using drawing 1. Drawing 1 is a flow chart which shows the flow of processing of the external storage controller concerning the operation gestalt of this invention.

[0011] The value of the convention time amount which, as for an external storage controller, a host computer prescribes receives the command from a host computer is set to the time amount T1 which can be processed (102), and time supervision is performed using this time amount T1 that can be processed (101). the time supervision of the whole command is started (103) and the access processing to the ordered object sector can be processed -- if it confirms whether to be less than [ time amount T1 ] (104) and is outside [ which can be processed ] time amount (although it is less than [ T1 ] if it is the usual processing) Since a magnetic disk drive with the actuation slower than the command processing time expected by high order equipment which the access processing time which becomes size requires may also be used, an error report (118) is carried out and a command is ended.

[0012] processing with the check of processing (104) is possible -- if it is less than [ time amount T1 ], access to the object sector will be performed (105), the time amount which can be processed is decreased by the time amount which access to the object sector took, and time

amount which can be processed is set to T2 (106). If an error occurs in this access (107), retry processing (109) will be performed after checking that the retry processing time is less than [ place Michiyoshi ability time amount T2 ] (108). And after decreasing the time amount which can be processed by the time amount which this retry took and making into T3 time amount which can be processed (110), it is confirmed whether the error was recovered or not (111). processing of (108) is possible for the retry processing time -- in the case of the check of being less than [ time amount T2 ], if it is outside [ which can be processed ] time amount T2, an error report will be performed (118) and a command will be ended.

[0013] When an error is not recovered at the time of the check of processing (111), it checks whether the retry of the count which a host computer specifies has been performed (112), and the retry of a convention time is not performed, and if it is less than the time amount that can be processed, retry processing will be performed again.

[0014] When error recovery or retry processing of \*\*\*\*\* is completed, automatic change processing judges whether it is the need with the set point of a category of error and others (113). In here, on the occasion of writing or read-out of data, the count of a retry reaches the number of conventions, or calls the processing by which the data is recorded on the change sector according to the factor of the error which carries out a retry etc. automatic change processing.

[0015] When performing automatic change processing, it investigates whether the time amount which automatic change processing takes is less than time amount T3 that can be processed, and judges whether automatic change processing is possible in time (114). When automatic change processing judged in time that it was impossible, a command is ended after an error report (118) and it is judged conversely that automatic change processing is possible, automatic change processing is performed (115). And the time amount which can be processed is decreased by the time amount which this automatic change processing took, and it considers as time amount T four which can be processed (116).

[0016] It confirms whether finally access of the data for a host computer demand was completed (117), and time supervision is repeatedly ended at the time of command termination, performing time supervision until the data access for a host computer demand is completed (119).

[0017]

[Effect of the Invention] As mentioned above, according to this invention, as explained, when an external storage controller supervises the whole command processing using actual time amount It becomes unnecessary to turn the time supervision (monitor of the retry processing time for every error on a table) by categories of error, such as a read error, a write error, or a seek error, up, and A command can be terminated within the time amount which the host computer of a high order specifies to the processing time of the whole command containing the access time not only to the retry processing time but the sector which retry processing does not generate etc.

[0018] Furthermore, by performing automatic change processing, after investigating whether automatic change processing can perform in time in advance before performing automatic change processing, it becomes avoidable [ the automatic change processing interruption generated when it reaches during automatic change processing at the convention time amount of a host computer ], and the danger that a failure generates becomes low.

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[Translation done.]